Business & Enterprise Systems

Integrity - Service - Excellence

AF Systems Engineering Assessment Model (AF SEAM)

Validation Assessment Training

Current: 14 January 2015

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Overview

- Training Objectives
- AF SEAM Overview and History
- AF SEAM Goals
- Policy
- AF SEAM Practices and Composition
- AF SEAM Assessment Process
- Validation Assessment Overview
- Validation Assessment Planning and Execution
- Scoring Methodology and Summaries
- Documenting Findings
- Next Steps…
- Validation Assessment Reporting

Training Objectives

- **Objectives**
  - Provide an overview of model
  - Teach the validation assessment process
  - Facilitate understanding of the validation assessment tool
- **Preparation**
  - Review the model content, elements, and definitions
- **Expected Outcomes**
  - Understand the contents of the model and scoring methodology
  - Be able to develop quality validation assessment responses
  - Understand how to use the validation assessment tool

What is AF SEAM?

- **Overview**
  - **Single AF-wide *process improvement tool* used for the assessment and improvement of systems engineering processes in a project or across an organization**
  - **Composite of industry and DoD best practices**
  - **Promotes consistent understanding/application of SE**
  - **Facilitates a gap analysis of an organization's SE processes**

- **History**
  - **Baseline released (August 2008) – Version 1.0**
  - **Became policy with AFMCI 63-1201 (October 2009)**
  - **Update released (September 2010) – Version 2.0**

Why We Need AF SEAM

- **Lack of disciplined system engineering application has been a major contributor to poor program performance**

- **Many problems have surfaced repeatedly with AF programs**
  - **Poor requirements development and management**
  - **Poor planning fundamentals**
  - **Lack of integrated risk and issue management**
  - **Lack of rigorous process application**
  - **Failure to deliver mission capabilities**

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AF SEAM Goals

- **Ensure a consistent understanding of systems engineering**
- **Ensure core SE processes are in place and being practiced at the *program/project* level**
- **Document repeatable SE "Best Practices" across AF**
- **Identify opportunities for continuous Improvement**
- **Clarify roles and responsibilities**
- **Improve program performance & reduce risk**

- **AF SEAM is NOT an appraisal of product quality**
- **AF SEAM is NOT a report card on personnel or the organization**

*The **Validation Assessment** has a further goal of providing an independent "audit" of process and practice usage with the additional intent of continuous process improvement*

AFMC Policy

- **AFMCI 63-1201, *Implementing OSS&E and Life Cycle Systems Engineering*, Change 2 (11 February 2011)**
  - *"Programs listed in the Air Force Systems Information Library (AFSIL) shall use AF SEAM as a self assessment tool to evaluate the organization's capability to perform SE processes. AF SEAM assessments shall be conducted annually." (Para 1.6)*
  - *"Organizations are encouraged to assess their programs managed under common processes within a single assessment. The assessment of common programs shall be at the organizational Division level or lower." (Para 1.6)*

BES Directorate Policy

- **AF PEO BES Policy:**
  - *ALL programs required to build a BPD Tailoring Worksheet (TWS) shall complete an AF SEAM Self-Assessment annually*
    - *FoS / SoS: If consolidated under a single TWS, perform a single AF SEAM Self-Assessment*
    - *Includes all ACAT and sustainment programs*

  - *Validation Assessments*
    - *All ACAT I/II/III programs will be subject to validation assessments*
    - *Other programs will be selected for validation assessments by the Director of Engineering (DoE)*

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AF SEAM Pedigree

- **AF SEAM Foundation:**
  - **Capability Maturity Model Integration (CMMI®)**
  - **Defense Acquisition Guidebook (DAG)**
  - **AFI 63-1201 – *Life Cycle Systems Engineering***
  - **ANSI/EIA 632 – *Processes for Engineering a System***
  - **IEEE/EIA 731 – *Systems Engineering Capability Model***
  - **ISO/IEEE 15288 – *Systems Engineering-System Life Cycle Processes***
  - **INCOSE – *System Engineering Standards***

AF SEAM Practices

- **Specific Practices**
  - Unique to each process area
  - Informative Material
    - Description
    - Typical Work Products
    - Other Considerations
    - References
    - Local References

- **Generic Practices**
  - Same questions apply to all process areas
  - Informative Material
    - Description
    - Typical Work Products
  - Facilitates successful achievement of specific practices and process area goals

AF SEAM Practice Composition

Process Areas	Goals	Specific Practices	Generic Practices	Total Practices
Configuration Management (CM)	3	8	7	15
Decision Analysis (DA)	1	5	7	12
Design (D)	3	14	7	21
Manufacturing (M)	4	12	7	19
Project Planning (PP)	3	15	7	22
Requirements (R)	4	13	7	20
Risk Management (RM)	3	7	7	14
Transition, Fielding & Sustainment (TFS)	4	15	7	22
Tech Mgmt & Control (TMC)	4	15	7	22
V & V (V)	5	16	7	23
IA SE Integration (IA)	4	10	7	17
Totals:	*38*	*130*	*77*	*207*

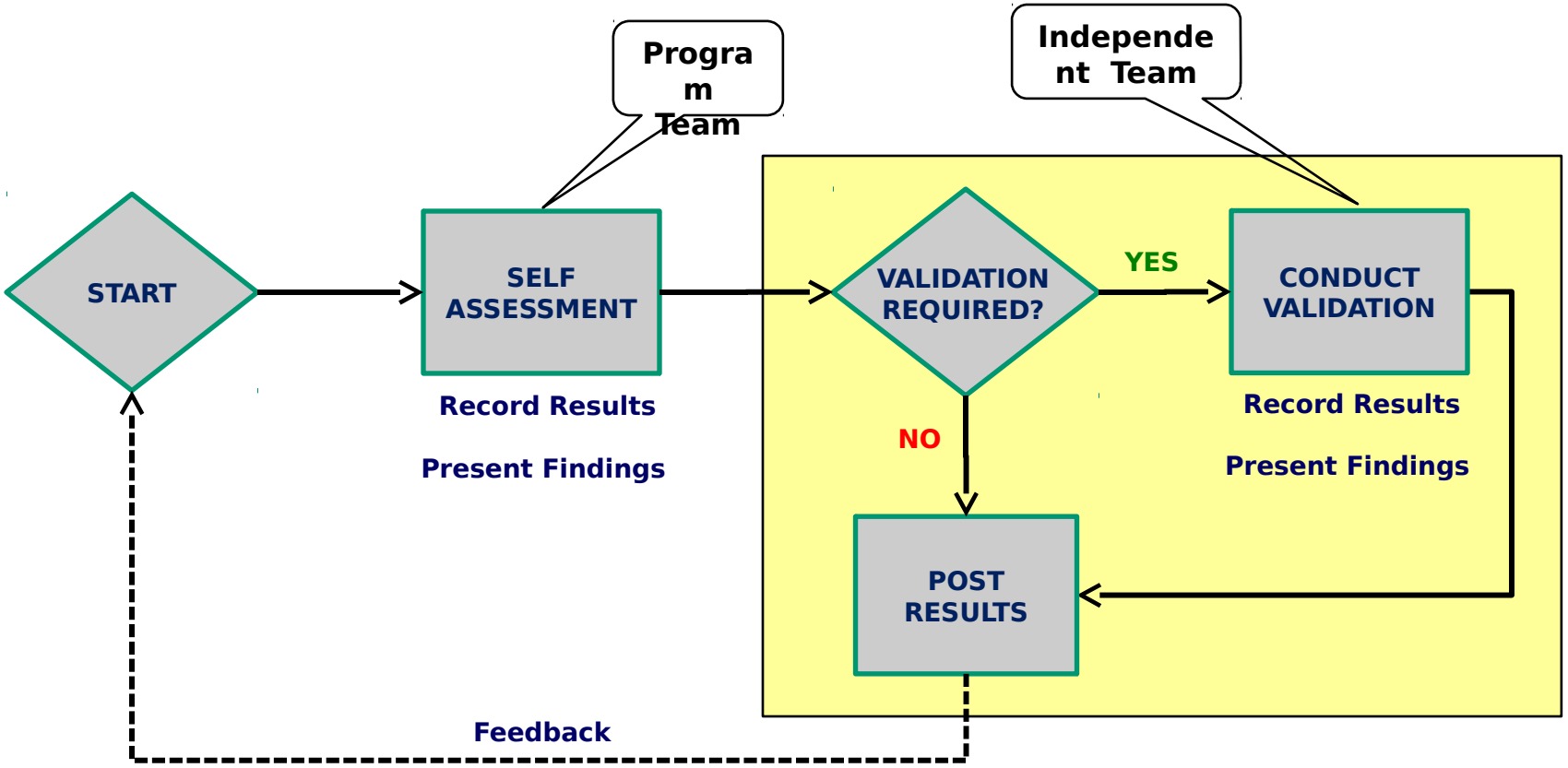
Sample Specific Practice

- **RMG1P1: Determine risk sources and categories**
- **Description: Establish categories of risks and risk sources for the project initially and refine the risk structure over time (e.g., schedule, cost, supplier execution, technology readiness, manufacturing readiness, product safety, and issues outside control of team), using Integrated Product Teams. Quantify the risk probability and consequence in terms of cost and schedule.**
- **Typical Work Products: Risk Management Plan; Risk Matrix**
- **Reference Material: DoD Risk Management Guide, AFI 90-901**
- **Other Considerations: Consider using Acquisition Center of Excellence Risk Management Workshops when needed. For manufacturing risks consider the**

Generic Practices

- **GP-1: Establish and maintain the description of a defined process**
- **GP-2: Establish and maintain plans for performing the process**
- **GP-3: Provide adequate resources for performing the process, developing the work products, and providing the services of the process**
- **GP-4: Assign responsibility and authority for performing the process, developing the work products, and providing the services of the process**
- **GP-5: Train the people performing or supporting the processes needed**
- **GP-6: Monitor and control the process**
- **GP-7: Review the activities, status, and results of the process with higher level management and resolve issues**

AF SEAM Assessment Process



Validation Assessment Overview

- **An AF SEAM Validation Assessment is an *independent assessment* of a project's/program's self–assessed implementation of SE practices, processes and procedures**
- **Who's involved**
  - **The Validation Assessment Team – led by the BES Process IPT; includes matrixed process area SMEs *independent* of the program office**
  - **Project/Program Office Team**
  - **Prime Contractor Team (as appropriate)**
- **The Validation Assessment is an opportunity to:**
  - **Ensure existence of disciplined systems engineering processes; validate project/program office demonstrated ability to execute processes**
  - **Identify strengths / best practices exercised by programs/projects**
  - **Identify opportunities for program/project or process improvement**

Validation Assessment Overview (Cont'd)

- **Who's involved and what's the schedule of events?**
  - **The Validation Assessment Team – led by the BES Process IPT; includes matrixed process area SMEs *independent* of the program office**
  - **Project/Program Office Team**

Day / Time	Activity	Validation Team POC	Est (Hours)	Program Office POC	Est (Hours)
Day 1 / 0800 - 1100	In-Brief / Training	ALL	3	ALL	3
Day 1 / 1100 - 1200	Lunch				
Day 1 / 1200 - 1600	Decision Analysis	SEPG1	2	Program Manager	2
	Project Planning	SEPG1	2	Program Manager	2
	Risk Management	SEPG2	2	Risk Manager	2
	Configuration Management	SEPG2	2	Configuration Mgr	2
Day 2 / 0800 - 1200	Requirements Management	SEPG1	4	Requirements Manager	4
	Design	SEPG2/Matrix EN1	4	Program Chief/Lead Engineer	4
Day 2 / 1200 - 1300	Lunch				
Day 2 / 1300 - 1600	Technical Mgt. & Control	SEPG1/Matrix EN1	2.5	Program Chief/Lead Engineer	2.5
	Manufacturing		0.5		0.5
	Info Assurance & Sys. Eng. Integration	SEPG2/Matrix IA	3	Information Assurance Mgr	3
Day 3 / 0800 - 1100	Sustainment	SEPG1/Matrix EN1	3	Program Manager / Engineer	3
	Verification & Validation	SEPG2/Matrix Test	3	Program Manager / Test Mgr	3
Day 3 / 1100 - 1200	Lunch				
Day 3 / 1200 - 1600	Review Assessment Results / Readdress	ALL	4	ALL	4
Day 4 / 0800 - 1100	Out-Brief Preparation	SEPG1/2	3	N/A	3
Day 4 / 1100 - 1200	Dry Run Out-Brief	SEPG1/2	1	Program Manager	1
Day 4 / 1200 - 1400	Lunch				
Day 4 / 1400 - 1600	Outbrief	ALL	2	ALL	2
Day 5 / 0800 - 1100	Prepare Final Report	SEPG1/2	3	N/A	3

Time Investment Required:	
POC	Total Hours
SEPG1	30
SEPG2	30
Matrix EN1	16
Matrix IA	12
Matrix Test	12
Program Manager	20
Risk Manager	11
Configuration Manager	11
Requirements Manager	13
Chief / Lead Engineer	16
Information Assurance Mgr	12
Test Manager	12
Total:	195

Validation Assessment Preparation & Execution

- **Plan**
  - **BPD Procedure: QAPR006 – AF SEAM Validation Assessment**
  - **Scope the Validation Assessment effort**
    - **Identify and allocate resources to each process area; this is a TEAM effort (not just engineering) – BES Process IPT will resource independent team members**
    - **Schedule Validation Assessment Team Training**
  - **Schedule Validation Assessment activities**
  - **Validation Team reviews project/program Self-Assessment results**
- **Execute Validation Assessment**
  - **Validation Team assesses each assigned area and records results on the AF SEAM Assessment Tool (AFSAT) spreadsheet**
    - **Interview project/program office personnel; review basic documentation (may include support contractors)**
    - **Select the appropriate score and document findings, strengths**

Scoring Methodology

- **Same methodology as Self-Assessment**
- **Compare project/program processes (how you do things) to the practice (a process standard, or what should be done) and answer…**
  - **(1) = YES – if your process completely satisfies the practice**
  - **(0) = NO – if your process does not satisfy or partially satisfies the practice (Give yourself partial credit in the explanation.)**
  - **N/A – if the practice does not apply either by uniqueness of the program, timing, or other circumstances**

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Documenting Findings…

- **Validation Team will make honest assessments of each practice**
  - **All findings will be discussed before final entries are recorded**
  - **Concise explanations of findings will be presented including references to the governance/guidance related to the finding**
- **Practices will only be scored YES if the project/program fully complies with the practice**
- **If a practice is partially meet and there is an opportunity to improve, it will be scored as NO and explained**

AFSAT Sample

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SG ID	AF SEAM Specific Goal (SG) Title	AF SEAM Specific Practice ID	AF SEAM Specific Practice (SP)	Description	Typical Work Products
CMG1	*The approach for technical baseline management is defined and documented.*				
		CMG1P1	Identify accountability for the disposition of, access to, release of and control of the technical baselines.	Establish and maintain a strategy for technical baseline management. Specify which configuration items will be controlled during the various phases of product development (i.e., what baselines will be established and when). Define the membership of the configuration control boards. Define which members will have authority to access and release design and product baselines, and authorize changes to the baselines as the product progresses through its life cycle.	(1) Systems Engineering Plan (SEP) (2) Configuration Control Board (CCB) Charter

VALIDATION ASSESSMENT

Score (0, 1, or N/A)	Assessment Team Findings & Comments	Additional Information and Work Products	Recommendations & Improvement Opportunities

SELECT FROM LIST OF VALUES 1, 0, or N/A

AFSAT Sample (Cont'd)

Validation Assessment Strengths & Improvement Opportunities			
Process Area	Practice ID	Strength	Improvement Opportunities

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Specific Practices Summary

AIR FORCE LIFE CYCLE MANAGEMENT CENTER — ACQUIRE, OPERATE, SUSTAIN, ENABLE — BUSINESS AND ENTERPRISE SYSTEMS

Validation Assessment SP Profile

Program/Project Name:
Date:

LEGEND
90-100%
65-89%
0-64%
Not Applicable / Tailored
Not Used

% of Scored	71%	60%	69%	100%	100%	91%	69%	100%	67%	67%	80%
Specific Goal 1	**CM**	**DA**	**D**	**IA**	**M**	**PP**	**R**	**RM**	**TFS**	**TMC**	**V**
SP 1.1	1	0	0	1	N/A	1	0	1	1	1	1
SP 1.2	1	0	1		N/A	1	0	1	0	1	0
SP 1.3		1	1		N/A	0	0	1	1	1	0
SP 1.4		1	1			1	1			1	1
SP 1.5		1	1								
Specific Goal 2	**CM**	**DA**	**D**	**IA**	**M**	**PP**	**R**	**RM**	**TFS**	**TMC**	**V**
SP 2.1	1		0	1	N/A	1	0	1	0	0	1
SP 2.2	1		0		N/A	1	1	1	0	0	1
SP 2.3	0		1		N/A	N/A			0	0	
SP 2.4	0		1			N/A			1	0	
SP 2.5						N/A			1	1	
SP 2.6						1					
SP 2.7						N/A					
SP 2.8						1					
Specfic Goal 3	**CM**	**DA**	**D**	**IA**	**M**	**PP**	**R**	**RM**	**TFS**	**TMC**	**V**
SP 3.1	N/A		0	1	N/A	1	1	1	1	1	1
SP 3.2	1		1	1	N/A	1	1	1	1	1	1
SP 3.3			1	1	N/A	1	1			1	1
SP 3.4			1								
SP 3.5			N/A								
Specific Goal 4	**CM**	**DA**	**D**	**IA**	**M**	**PP**	**R**	**RM**	**TFS**	**TMC**	**V**
SP 4.1				1	N/A		1		N/A	1	1
SP 4.2				1	1		1		N/A	0	1
SP 4.3				1	N/A		1		N/A	1	1
SP 4.4				1			1		1		N/A
SP 4.5				1					1		0
Specific Goal 5	**CM**	**DA**	**D**	**IA**	**M**	**PP**	**R**	**RM**	**TFS**	**TMC**	**V**
SP 5.1											1
SP 5.2											1

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Generic Practices Summary

Validation Assessment GP Scoresheet

Program/Project Name:

Date:

PA/GP	GP1	GP2	GP3	GP4	GP5	GP6	GP7	GP Overall
CM								6
DA								3
D								7
IA								7
M	N/A	N/A		N/A	N/A	N/A	N/A	1
PP								7
R								7
RM								7
TFS								2
TMC								4
V								4

NOTE: GP Overall Score color is based on the number of GPs assessed as being accomplished. Scores: 0-3 (Red), 4-5 (Yellow), and 6-7 (Green).

N/A = Recommended organizational tailoring

Combined Summary

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Briefing Slide Templates

Specific Practices	CM	DA	D	IA	M	PP	R	RM	TFS	TMC	V
Self-Assessment Score	71%	80%	82%	100%	100%	64%	54%	100%	67%	75%	
Validation Assessment Score	71%	60%	69%	100%	100%	91%	69%	100%	67%	67%	80%

Generic Practices	CM	DA	D	IA	M	PP	R	RM	TFS	TMC	V
Self-Assessment Score	4	3	7	7	0	7	3	7	2	2	
Validation Assessment Score	6	3	7	7	1	7	7	7	2	4	4

	Self-Assessment		Validation	
	SP	GP	SP	GP
Configuration Management	71%	4	71%	6
Decision Analysis	80%	3	60%	3
Design	82%	7	69%	7
Info Assurance & Sys. Eng Integration	100%	7	100%	7
Manufacturing	100%	0	100%	1
Project Planning	64%	7	91%	7
Requirements	54%	3	69%	7
Risk Management	100%	7	100%	7
Transition, Fielding, & Sustainment	67%	2	67%	2
Technical Management & Control	75%	2	67%	4
Verification & Validation			80%	4

GP Scoring:	
0-3	
4-5	
6-7	

SP Scoring:	
90-100%	
65-89%	
0-64%	

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What's Next?

- Review each N/A score for reasonableness
- Prioritize each NO score into one of four categories
  - Compliance item – we must do this
  - Adds great value to program – we're going to do this
  - Adds value – we'd like to do this but we do not have enough resources
  - No or little value – we are not going to do this (now or later) because it brings little or no value; document
- Each NO item should generate a program risk / action item
  - Build handling plans (mitigation, etc.) to address highest priority items

Validation Assessment Reporting

- **Brief Branch/Division Leadership/Director of Engineering**
  - **Formal outbrief using AFSAT Tool Summaries**
  - **Highlight program strengths and improvement opportunities**
  - **Review risks generated for practices scored NO**
- **Prepare Final Validation Assessment Report**
- **Compile PEO Summary of Validation Assessment Results (BES Process IPT)**
  - **Identify systemic and organizational strengths / improvement opportunities**
  - **Analyze / implement organizational process changes necessary**
  - **Brief the PEO and/or Senior Staff on Organizational**

Summary

- **AF SEAM was designed to**
  - **Promote consistent understanding/application of Systems Engineering Discipline**
  - **Facilitate Continuous Process Improvement (CPI) – at the program and organizational levels**
  - **Ultimately – Improve Program Performance**

- **Understanding the AF SEAM Model and Methodology is imperative to performing the validation assessments**

- **AF SEAM Assessments are a <u>TEAM</u> effort; all members of the validation team must work collaboratively for assessments to be a success – that efforts leads to improved program performance**

Recap and Feedback

- **Do you have any unanswered questions?**
- **Did we meet the objectives as stated?**
- **Don’t forget to request your CLPs!**
- **Please fill out a critique so we can improve this class for those who may attend in the future; written suggestions are very helpful**